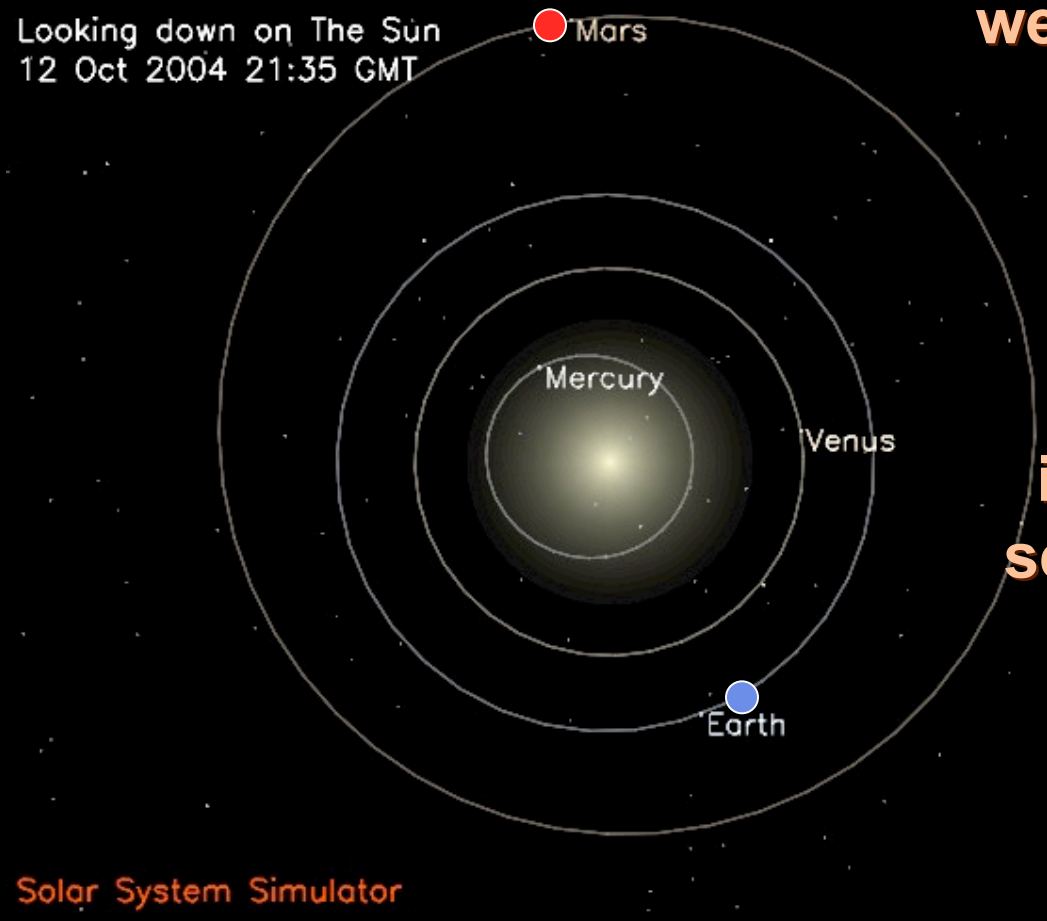
Mars Exploration Rover Mission

Spirit and Opportunity

Month in Review
September 4 - October 8

Sprit and Opportunity are back in action after a few weeks of a miniature vacation due to communication difficulties when Earth and Mars were on opposite sides of the Sun.



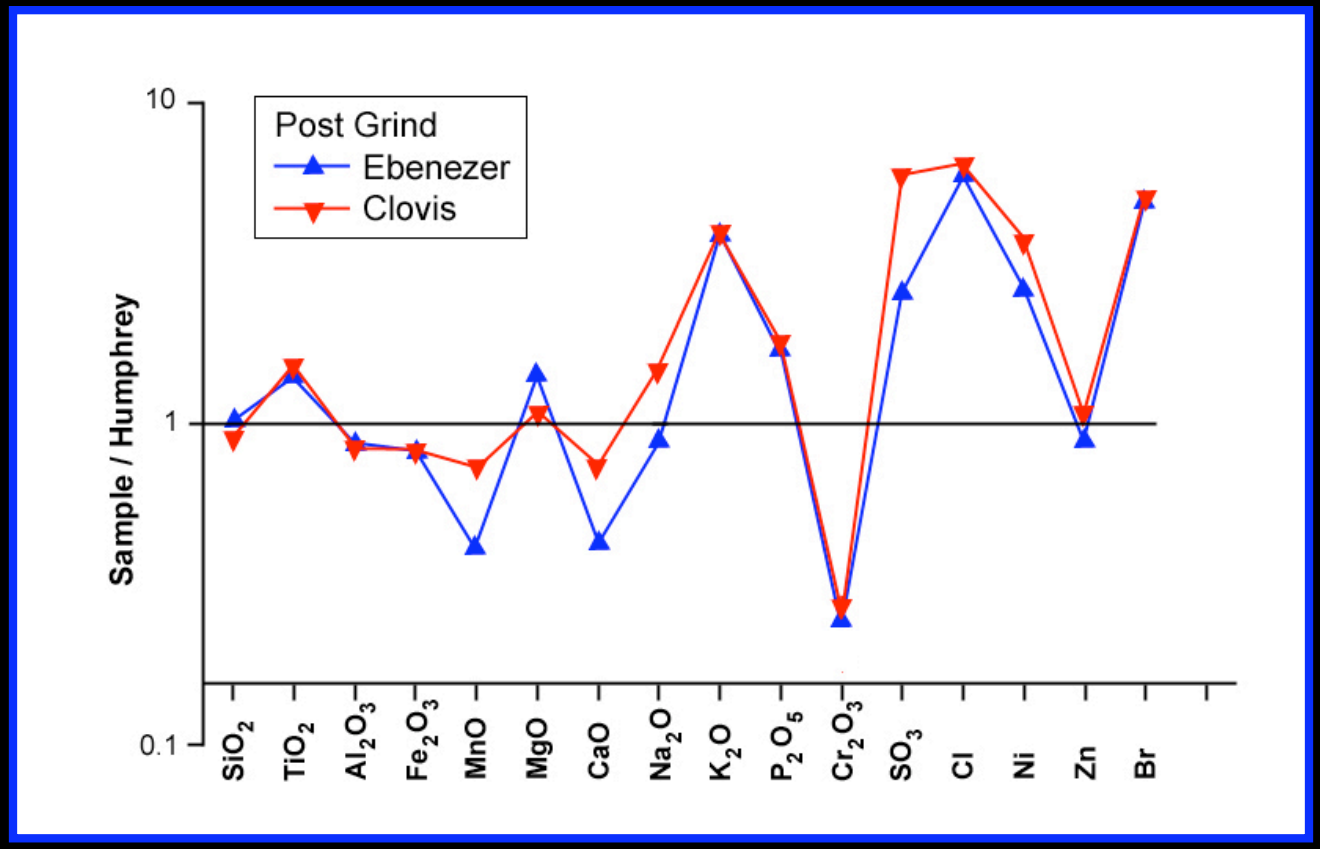
The rovers are back in contact with Earth, sending more exciting evidence of past liquid water on Mars.

Orbit simulations of Mercury, Venus, Earth, and Mars after Earth's solar conjunction with Mars.

Before solar conjunction,
Spirit investigated the rock Ebenezer
with the rock abrasion tool and the alpha particle X-ray spectrometer to determine the rock's chemistry.

True-color panoramic camera image taken September 1, 2004.

Data from Spirit's alpha particle X-ray spectrometer revealed the elemental chemistry of two rocks, Ebenezer and Clovis, in the Columbia Hills.



Alpha particle X-ray spectrometer graph.

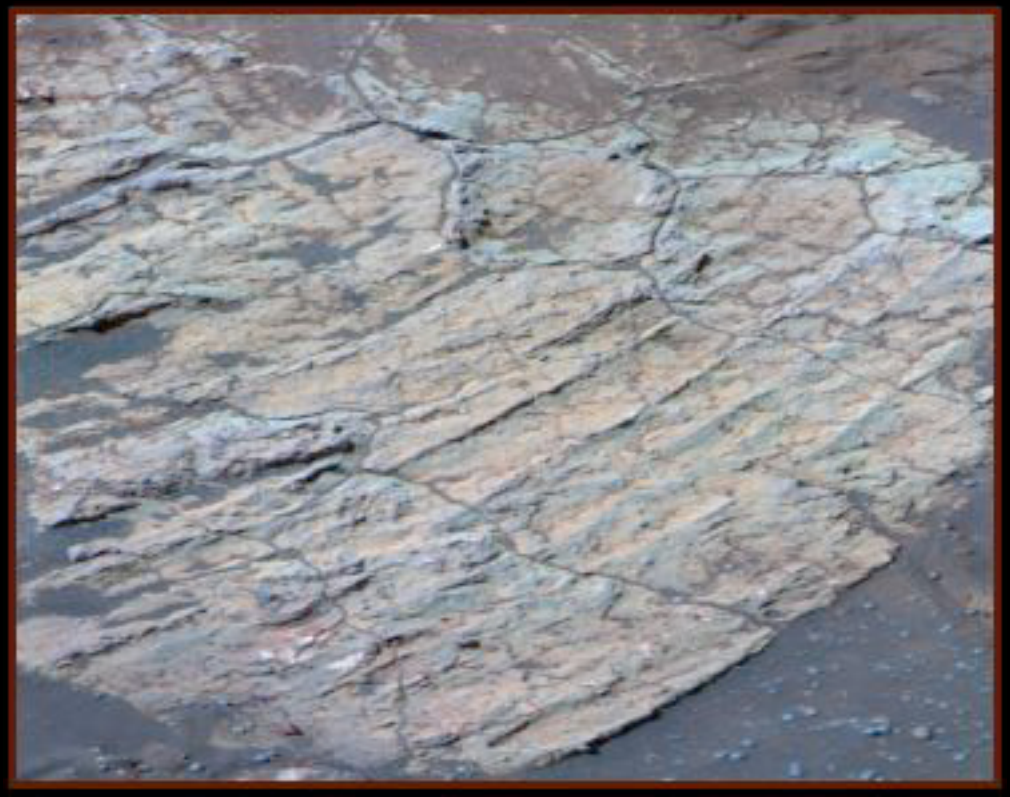
Scientists found that these rocks have very different compositions from the rocks Spirit found earlier on the Gusev plains, and these may have been altered by water.

Scientists are hoping to discover whether this interesting rock in the Columbia Hills formed by a volcanic process or was laid down by water or wind.

Panoramic camera image of Tetl.

They named the rock “Tetl,” which means “stone” in the ancient Mayan language.

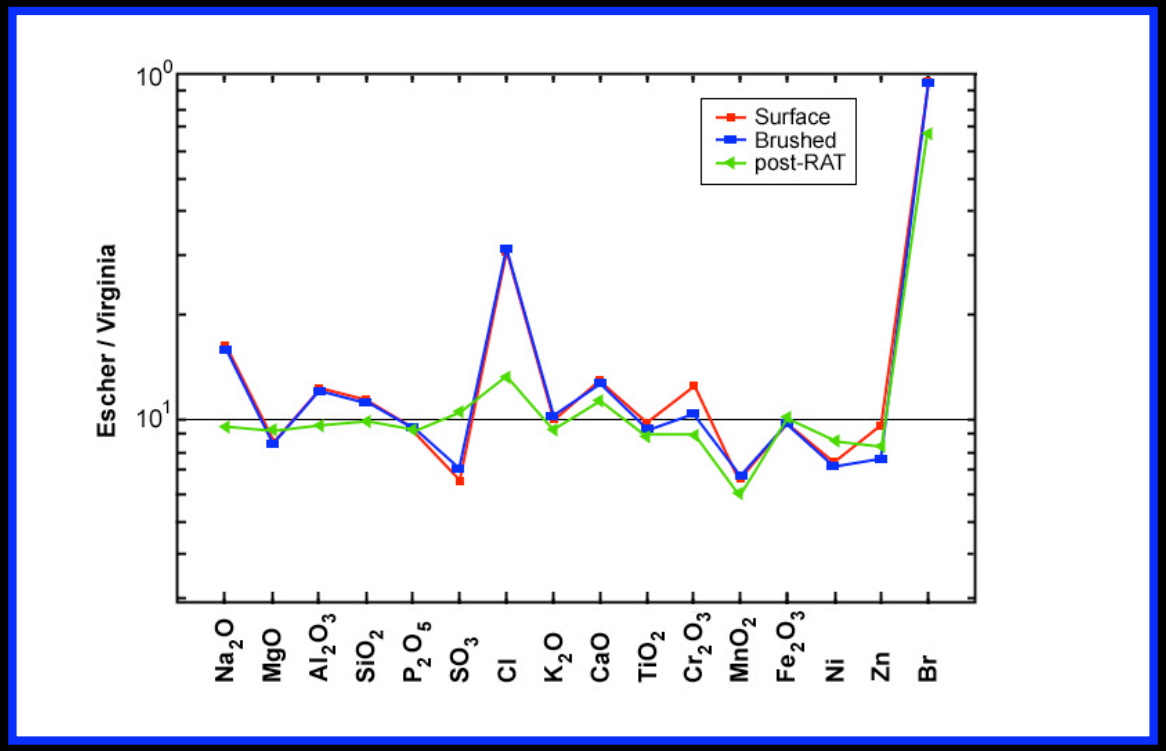
Meanwhile, Opportunity finished studying a rock dubbed Escher on the southwestern slopes of Endurance Crater.



False-color panoramic camera image of Escher.

Scientists believe one way the rock's fractures may have arisen was when water leftover from the rock's formation dried up.

Scientists compared ratios of chemicals between rocks named Escher and Virginia before and after Opportunity drilled into the rocks.



Alpha particle X-ray spectrometer graph.

Scientists discovered that Escher, which is deeper inside the crater, was chemically altered more than Virginia. This alteration could result from exposure to water, which is key to the development of life on Earth.

Scientists named this rock “Earhart” after the pilot Amelia Earhart.

False-color panoramic camera image of Earhart.

Like other rocks dotting the bottom of Endurance crater, this rock could have formed by the impact that created the crater or through different types of interaction with water.

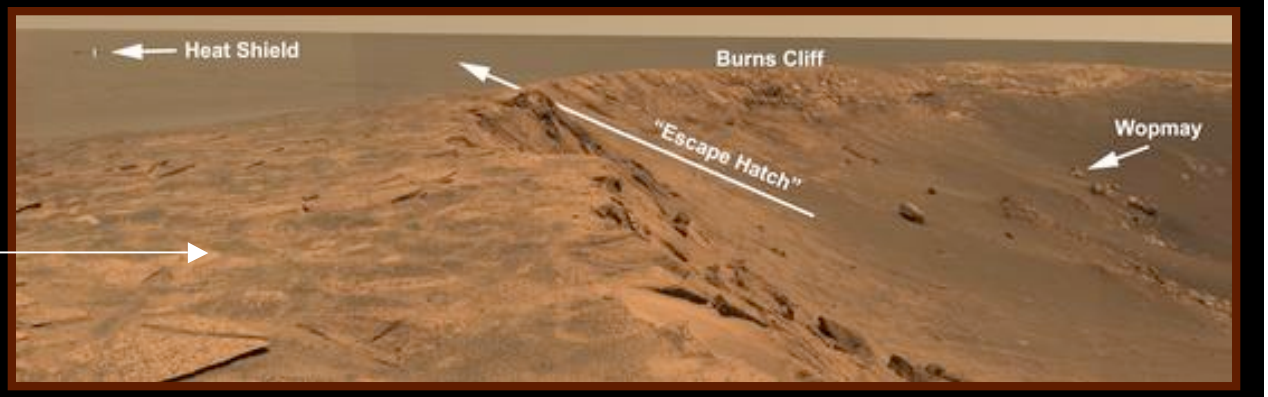
Scientists found this unusual, lumpy rock on the lower slopes of Endurance.

The lumps may be related to cracking and alteration processes, possibly caused by exposure to water.

The rock is named “Wopmay” after the Canadian bush pilot Wilfrid Reid “Wop” May.

Approximate true-color panoramic image of Wopmay, taken October 4, 2004.

Opportunity may exit Endurance Crater via the "Escape Hatch" route after studying Wopmay.



Panoramic image of Endurance Crater taken September 14, 2004.

Panoramic camera mosaic of the Columbia Hills taken between August 9 and August 19, 2004

Spirit has driven about 2.3 miles (3,641 meters). Future plans are to drive to a target named "Machu Picchu" after an ancient Incan city in Peru.